

WHAT IS CLAIMED IS:

1. A data structure of a multocular digital stereo image file which is formed by a plurality of monocular images of different viewpoints, and is recorded as digital data,

wherein all image data including all pieces of image information of the plurality of monocular images, and stereo data as information which pertains to a construction as a stereo image except for the image information are inseparably arranged in construction units of a single file.

2. A data structure of an image file according to claim 1, wherein the stereo data contains identification information indicating whether or not the image file is a stereo image file, information used to reproduce the respective monocular images from all the pieces of image information, and information associated with a layout of the monocular images.

3. A data structure of an image file according to claim 1, wherein the stereo data is described in a header field of the image file.

4. A data structure of an image file according to claim 1, wherein all the image data form parallel layout type stereo image data obtained by arranging the respective pieces of image information of the plurality of monocular images at different positional regions on one two-dimensional image.

5. A data structure of an image file according to claim 4, wherein the monocular images include two, right and left images corresponding to binocular view of right and left eyes, and the parallel layout type stereo image data is a stereo image pair (SPM) in which the right and left images are arranged at right and left positions.

6. A data structure of an image file according to claim 4, wherein the parallel layout type stereo image data is obtained by forming a predetermined frame line on boundary regions of the monocular images.

7. A recording medium that stores a digital stereo image file having a data structure cited in claim 1 so as to be readable by a machine.

8. A method of generating a multocular digital stereo image file which is formed by a plurality of monocular images of different viewpoints, and is recorded as digital data, comprising:

the image data generation step of generating all image data containing all pieces of image information of the plurality of monocular images;

the stereo data generation step of generating stereo data as information which pertains to a construction of a stereo image except for the image information; and

the image file generation step of generating a single digital image file by combining all the image

data and the stereo data as the digital stereo image file.

9. A generation method of an image file according to claim 8, wherein the stereo data contains identification information indicating whether or not the image file is a stereo image file, information used to reproduce the respective monocular images from all the pieces of image information, and information associated with a layout of the monocular images.

10. A generation method of an image file according to claim 8, wherein the stereo data is described in a header field of the image file.

11. A generation method of an image file according to claim 8, wherein all the image data form parallel layout type stereo image data obtained by arranging the respective pieces of image information of the plurality of monocular images at different positional regions on one two-dimensional image.

12. A generation method of an image file according to claim 11, wherein the monocular images include two, right and left images corresponding to binocular view of right and left eyes, and the parallel layout type stereo image data is a stereo image pair (SPM) in which the right and left images are arranged at right and left positions.

13. A generation method of an image file according to claim 11, wherein the parallel layout type stereo

image data is obtained by forming a predetermined frame line on boundary regions of the monocular images.

14. An apparatus for generating a multocular digital stereo image file which is formed by a plurality of monocular images of different viewpoints, and is recorded as digital data, comprising:

image data generation means for generating all image data containing all pieces of image information of the plurality of monocular images;

stereo data generation means for generating stereo data as information which pertains to a construction of a stereo image except for the image information; and

image file generation means for generating a single digital image file by combining all the image data and the stereo data as the digital stereo image file.

15. A generation apparatus for an image file according to claim 14, wherein the stereo data contains identification information indicating whether or not the image file is a stereo image file, information used to reproduce the respective monocular images from all the pieces of image information, and information associated with a layout of the monocular images.

16. A generation apparatus for an image file according to claim 14, wherein the stereo data is described in a header field of the image file.

17. A generation apparatus for an image file

according to claim 14, wherein all the image data form parallel layout type stereo image data obtained by arranging the respective pieces of image information of the plurality of monocular images at different positional regions on one two-dimensional image.

18. A generation apparatus for an image file according to claim 17, wherein the monocular images include two, right and left images corresponding to binocular view of right and left eyes, and the parallel layout type stereo image data is a stereo image pair (SPM) in which the right and left images are arranged at right and left positions.

19. A generation apparatus for an image file according to claim 17, wherein the parallel layout type stereo image data is obtained by forming a predetermined frame line on boundary regions of the monocular images.

20. An imaging apparatus comprising:

a stereo imaging optical system for receiving light rays coming from an object at different positions corresponding to parallax, and guiding the received light rays toward different regions of a pickup unit; imaging means for obtaining an object image signal on the basis of the output from the pickup unit;

image frame setting means for setting a plurality of monocular image frames corresponding to a plurality of monocular images as building components of one

multocular stereo image in an imaging area of the pickup unit by executing a predetermined trimming process of the object image signal; and

5 stereo image generation means for generating a multocular stereo image having a predetermined data structure on the basis of a plurality of monocular images obtained in correspondence with the plurality of imaging frames.

21. An imaging apparatus according to claim 20,
10 wherein the trimming process executed by said imaging frame setting means is done at identical vertical and horizontal trimming ratios with reference to 100% trimming as a trimming state when the plurality of monocular image frames occupy a maximum region.

22. An imaging apparatus according to claim 20,
15 wherein said stereo imaging optical system is prepared by attaching, before a single-lens imaging optical system, a stereo adapter as an optical system for splitting a single field of view of the imaging optical
20 system into a plurality of fields of view having predetermined parallax.

23. An imaging apparatus according to claim 20,
wherein said stereo imaging optical system is a binocular type stereo optical system having a pair of
25 right and left optical axes.

24. An imaging apparatus according to claim 20,
wherein the multocular stereo image generated by said

stereo image generation means has:

a data structure of a multocular digital stereo image file, which is formed by a plurality of monocular images of different viewpoints, and is recorded as digital data, and

in which all image data including all pieces of image information of the plurality of monocular images, and stereo data as information which pertains to a construction as a stereo image except for the image information are inseparably arranged in construction units of a single file.

25. An image generation apparatus according to claim 14, wherein the plurality of monocular images are input from independent image files.

26. A recording medium which machine-readably stores a single image file having a data structure, which comprises:

one image data which generates a single stereo image by first and second monocular images formed via first and second optical axes having a span substantially corresponding to parallax; and

header information which contains an item indicating that the first and second monocular images are contained in said image data, an item indicating that the first and second monocular images belong to a single stereo image, and an item associated with addresses of the first and second monocular images, and

is inseparable from the image data.

27. A recording medium according to claim 26,
wherein the first and second monocular images are
two-dimensional images which are arranged side by side
to form a single stereo image.

28. A recording medium according to claim 26,
wherein the first and second monocular images are
trimmed to form a single stereo image.

29. A recording medium according to claim 26,
wherein the first and second monocular images are
trimmed at identical trimming ratios to form a single
stereo image.

30. A method of generating three-dimensional image
data, comprising:
the image data generation step of generating first
and second monocular images by forming an object image
via first and second optical axes substantially
corresponding to parallax, and generating one image
data corresponding to a single stereo image on the
basis of the first and second monocular images;
the header information generation step of
generating header information which contains an item
indicating that the first and second monocular images
are contained in said image data, an item indicating
that the first and second monocular images belong to a
single stereo image, and an item associated with
addresses of the first and second monocular images; and

the recording step of recording a single image file having a data structure that contains the image data and the header information which is inseparable from the image data on a recording medium.

5 31. A method according to claim 30, wherein the first and second monocular images are two-dimensional images which are arranged side by side to form a single stereo image.

10 32. A method according to claim 30, wherein the first and second monocular images are trimmed to form a single stereo image.

15 33. A method according to claim 30, wherein the first and second monocular images are trimmed at identical trimming ratios to form a single stereo image.

 34. An apparatus for generating a three-dimensional image or stereograph having one file structure, and recording the three-dimensional image on a recording medium, comprising:

20 image data generation means for generating first and second monocular images by forming an object image via first and second optical axes substantially corresponding to parallax, and generating one image data corresponding to a single stereo image on the
25 basis of the first and second monocular images;

 header information generation means for generating header information which contains an item indicating

that the first and second monocular images are contained in said image data, an item indicating that the first and second monocular images belong to a single stereo image, and an item associated with
5 addresses of the first and second monocular images; and

recording means for recording a single image file having a data structure that contains the image data and the header information which is inseparable from the image data on a recording medium.

10 35. An apparatus according to claim 34, wherein the first and second monocular images are two-dimensional images which are arranged side by side to form a single stereo image.

15 36. An apparatus according to claim 34, wherein the first and second monocular images are trimmed to form a single stereo image.

20 37. An apparatus according to claim 34, wherein the first and second monocular images are trimmed at identical trimming ratios to form a single stereo image.

38. A stereo digital camera for generating a three-dimensional image or stereograph having one file structure, and recording the three-dimensional image on a recording medium, comprising:

25 an optical system which has right and left optical axes substantially corresponding to parallax, and forms object images;

a single pickup unit for generating one image data corresponding to a single stereo image on the basis of right and left monocular images formed thereon via said optical system;

5 header information generation means for generating header information which contains an item indicating that the first and second monocular images are contained in said image data, an item indicating that the first and second monocular images belong to a
10 single stereo image, and an item associated with addresses of the first and second monocular images; and

recording means for recording a single image file having a data structure that contains the image data and the header information which is inseparable from
15 the image data on a recording medium.

39. A stereo digital camera according to claim 38, wherein the first and second monocular images are two-dimensional images which are arranged side by side to form a single stereo image.

20 40. A stereo digital camera according to claim 38, wherein the first and second monocular images are trimmed to form a single stereo image.

41. A stereo digital camera according to claim 38, wherein the first and second monocular images are
25 trimmed at identical trimming ratios to form a single stereo image.